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Personal Statement

Research Interests

My research focuses on statistical methods, mainly for biological and medical data. I have a strong interest both in understanding the structures inherent in models and estimation procedures, and in understanding phenomena and discovering knowledge in natural science domains. Specifically, I work on (1) constructing estimation methods that yield stable results, based on approaches such as regularization and the aggregation of multiple analysis results, (2) elucidating properties of models, such as identifiability and the existence of estimates, and (3) developing methods for individual problems and conducting empirical studies in fields such as epidemiology and epigenetics.

Keywords

Regularized estimation, Sparse estimation, Bayesian computation, Statistics on metric spaces, Biological and medical data analysis

Education

The University of Tokyo — **Tokyo, Japan**
Department of Biostatistics, Graduate School of Medicine — Apr 2020 – Mar 2023
– **Doctor of Philosophy - Ph.D.**

The University of Tokyo — **Tokyo, Japan**
Biostatistics and Bioinformatics, Graduate School of Interdisciplinary Information Studies — Apr 2018 – Mar 2020
– **Master of Arts and Sciences - M.A.S.**

Kyoto University — **Kyoto, Japan**
Department of Bioresource science, Faculty of Agriculture — Apr 2014 – Mar 2018
– **Bachelor of Science - B.S.**

Recent Experience

National Institute of Infectious Diseases, Japan Institute for Health Security — **Tokyo, Japan**
Department of Epidemiology — Apr 2025 – Present
– **Senior Research Scientist**

National Institute of Infectious Diseases — **Tokyo, Japan**
Center for Surveillance, Immunization, and Epidemiologic Research — Apr 2024 – Mar 2025
– **Senior Research Scientist**

Keio University School of Medicine — **Tokyo, Japan**
Department of Health Policy and Management — Apr 2023 – Mar 2024
– **Instructor**

National Center of Neurology and Psychiatry — **Tokyo, Japan**
Department of Clinical Data Science — Apr 2020 – Mar 2023
– **Research Fellow**

Publications *(4 selected from 23 total publications)*

General Statistical Methods and Theoretical Studies

1. **Yui Tomo**⋆. "A Note on Estimation Error Bound and Grouping Effect of Transfer Elastic Net." *Communications in Statistics - Theory and Methods* (2026). https://doi.org/10.1080/03610926.2026.2626155. **(First/Corresponding)**

Methodological and Empirical Studies in Medical & Biological Domains

2. **Yui Tomo**⋆, Funato Sato, Mari Oba. "A Comparative Simulation Study of Cluster Ensemble Algorithms Integrated with Multiple Imputation for Clustering with Missing Data." *BMC Medical Research Methodology* (2026). https://doi.org/10.1186/s12874-026-02869-2. **(First/Corresponding)**
3. **Yui Tomo**⋆, Ryo Nakaki. "iComBat: An Incremental Framework for Batch Effect Correction in DNA Methylation Array Data." *Computational and Structural Biotechnology Journal* 27 (2025): 4121-4131. https://doi.org/10.1016/j.csbj.2025.09.014. **(First/Corresponding)**
4. **Yui Tomo**⋆, Ryo Nakaki. "Transfer Elastic Net for Developing Epigenetic Clocks for the Japanese Population." *Mathematics* (Special Issue: Statistical Methods and Applications in Genetics and Genomics) 12.17 (2024): 2716. https://doi.org/10.3390/math12172716. **(First/Corresponding)**

See Google Scholar for a full list of publications including collaborative studies joined as a statistician.

⋆: Correspondence, †: Equal Contribution

Preprints

General Statistical Methods and Theoretical Studies

1. **Yui Tomo**⋆, Shinto Eguchi, Daisuke Yoneoka. "Zero-Inflated Logistic Regression Models with Shared Design: Identifiability, Existence of Estimates, and a Relabeling Rule." *arXiv preprint arXiv:2604.20322* (2026). https://doi.org/10.48550/arXiv.2604.20322. **(First/Corresponding)**

2. Shu Tamano⋆, **Yui Tomo**. "Location–Scale Calibration for Generalized Posterior." *arXiv preprint arXiv:2511.15320* (2025). https://doi.org/10.48550/arXiv.2511.15320.
3. Shu Tamano, **Yui Tomo**⋆. "Efficient Gibbs Sampling in Cox Regression Models Using Composite Partial Likelihood and Pólya-Gamma Augmentation." *arXiv preprint arXiv:2506.04675* (2025). https://doi.org/10.48550/arXiv.2506.04675. **(Corresponding)**
4. **Yui Tomo**⋆, Daisuke Yoneoka. "Median Consensus Embedding for Dimensionality Reduction." *arXiv preprint arXiv:2503.08103* (2025). https://doi.org/10.48550/arXiv.2503.08103. **(First/Corresponding)**
5. Mitsunori Ogawa⋆, **Yui Tomo**. "Existence of Firth's modified estimates in binomial regression models." *arXiv preprint arXiv:2304.07484* (2023).

Methodological and Empirical Studies in Medical & Biological Domains

6. **Yui Tomo**, Seowoong Jung, Yuka Kudo-Nagata, Ryoko Sekiya, Kazuaki Fukushima, Ai Kawana-Tachikawa, Ryo Nakaki, Akifumi Imamura, and Ayu Kasamatsu⋆. "Epigenetic Aging and Associated Factors in Japanese People Living with HIV: A Protocol for a Single-Center Cross-Sectional Study." *medRxiv* (2026). https://doi.org/10.64898/2026.09.04.26362252 **(First)**
7. **Yui Tomo**⋆. "A Methodological Note on Empirical Confidence Intervals for the GCM-Ensemble Mean in Projecting Climate Change Impacts on Health." *medRxiv* (2026). https://doi.org/10.64898/2026.08.01.26359345 **(First/Corresponding)**
8. **Yui Tomo**⋆, Shu Tamano, Daisuke Yoneoka. "Estimating Consensus Epidemic Trajectories via a Constrained Power Fréchet Mean with Functional Registration." *arXiv preprint arXiv:2605.10069* (2026). https://doi.org/10.48550/arXiv.2605.10069. **(First/Corresponding)**
9. Tatsuma Shoji, **Yui Tomo**, Ryo Nakaki⋆. "Predicting Biological Age and Clinical Biomarkers from DNA Methylation Profiles of Cheek Mucosa." *bioRxiv* (2026). https://doi.org/10.64898/2026.05.12.724485.
10. **Yui Tomo**⋆, Tatsuma Shoji, Ryo Nakaki. "Cross-Platform Calibration of Epigenetic Age Between the EPICv2 and MSA Arrays." *bioRxiv* (2025). https://doi.org/10.64898/2025.12.10.693592. **(First/Corresponding)**

⋆: Correspondence, †: Equal Contribution

Talks *(5 selected from 25 total talks as a speaker)*

1. Sep 10, 2025: **Yui Tomo**, Shu Tamano, Daisuke Yoneoka, "Arrival time statistics under fractal SIR model", Japanese Joint Statistical Meeting 2025, Kansai University, Osaka, Japan.
2. Feb 12, 2025: **Yui Tomo**, "Bias analysis", Pre-seminar of the Japan Epidemiological Association 2025 "Discovering New Frontiers in Epidemiology", Kochi City Culture-Plaza CUL-PORT, Kochi, Japan. **(Invited)**
3. Oct 24, 2024: **Yui Tomo**, Ryo Nakaki, "Development of Epigenetic Clocks for the Japanese Population: A New Transfer Learning Approach Based on Elastic Net Regularization", 1st Asia & Pacific Bioinformatics Joint Conference (APBJC2024), NAHA CULTURAL ARTS THEATER NAHArt, Okinawa, Japan.
4. May 12, 2023: **Yui Tomo**, "Development and practical insights of a user-friendly app for molecular species identification based on mass spectrometry", The 8th Workshop of Mass Spectrometry Informatics, RIKEN Yokohama Branch, Yokohama, Japan.
5. Nov 27, 2021: **Yui Tomo**, Mitsunori Ogawa, "An improved algorithm for computing confidence limits of Firth's maximum penalized likelihood method in logistic regression", The 35th Symposium of the Japanese Society of Computational Statistics, Keio University, Tokyo, Japan. **(Student Research Presentation Award)**

Awards

Student Research Presentation Award Nov 2021
– Japanese Society of Computational Statistics

Outstanding Master's Thesis Award Mar 2020
– Graduate School of Interdisciplinary Information Studies, The University of Tokyo

Funding

1. Dec 2025 – Nov 2026: "Exploration of modifiable factors for QOL enhancement in Japanese HIV patients through epigenetic aging markers.", Pfizer Health Services Research Grant 2025. **(Principal Investigator)**
2. Apr 2024 – Mar 2027: "Research on identifying factors related to the onset/progression of diabetes and kidney diseases and estimating their impact on population health outcomes in Japan.", KAKENHI Grant-in-Aid for Scientific Research (C). **(Co-Investigator)**

Seminar / Lecture

Seminar

1. Dec 8, 2025: "Development of Epigenetic Clocks on Small Data via Transfer Learning: A Case Study on Developing Clocks for the Japanese Population", The 12th SAKRA (Society for Advancing Knowledge in Rejuvenation and Ageing) Seminar & Networking Event, online (URL: `https://tayo.jp/events/01KAJ5YQZWT2EV8VWBMN7DKAZX`). **(Invited)**

Lecture

2. Nov 14, 2020: "Determination of Statistical Analysis Methods, Sample Sizes and Target Population", Pharmatrain/PRP Course, Graduate School of Pharmaceutical Sciences, Osaka University, Japan.

Software / Tools

1. **mcepy**: A Python library for stable data visualization via Median Consensus Embedding (URL: `https://github.com/t-yui/mcepy`)
2. **Ceramide Candidate Search**: A small web tool to search for candidate molecular species of sphingolipids based on MS1 / MS2 outputs from LC-MS/MS (URL: `https://t-yui.github.io/ceramideapp.html`)

Skills

Computer Skills

– Python, R, Julia, Bash, git, GitHub, Docker

Language Skills

– Japanese (Native), English (Proficient)

Professional Societies

Japan Statistical Society
Japanese Society of Computational Statistics
Japanese Society for Bioinformatics
The Biometric Society of Japan
The Japan Epidemiological Association
The Japanese Society for AIDS Research
Japanese Society of Applied Statistics